Minerva 37: 235–258, 1999.

The McNamara Line and the Turning Point for Civilian Scientist-Advisers in American Defence Policy, 1966–1968

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IN THE MID-1960s the role of civilian scientists in the defence policy-making process changed fundamentally. From the Second World War until the Vietnam war, American scientists had played an unprecedented and direct role in the highest level of decision-making about national security policy. After this period, these scientist-advisers' importance declined dramatically. The McNamara Line—an electronic barrier or fence aimed at stemming the infiltration of men and supplies into South Vietnam—originated in the mid-1960s and played an important role in precipitating this shift.

The crux of both this case and of the broader issues surrounding civilian scientist-advisers can be neatly summarised: "If the military would have preferred to shackle science to serve as needed, the scientists supposed they could use their leverage to tame and confine military capabilities commensurate to how they saw them as fitting in with the requirements of national security."[1] Understanding the dynamics of this tension through study of the peak of the American experience with civilian scientist-advisers should be of interest to scholars, scientists and policy-makers.

Scientist-Advisers in Defence Policy

Most historians trace the beginning of a significant role for scientists in defence policy-making to the Second World War. My focus is on civilian—primarily academic—scientists who provided external, independent advice to insider politicians, bureaucrats and generals on issues of defence policy in the United States. These scientists were for the most part natural, or hard, scientists. Without repeating the work of numerous qualified scholars,[2] it is

[1] Trenn, Thaddeus J., *America's Golden Bough: The Science Advisory Intertwist* (Cambridge, Mass.: Oelgeschlager, Gunn and Hain, 1983), p. 31.

[2] Longer histories include *ibid.*; Smith, Bruce L. R., *American Science Policy since World War II* (Washington, DC: Brookings Institution, 1990), and *The Advisors: Scientists in the Policy Process* (Washington, DC: Brookings Institution, 1992); Price, Don K., *The Scientific Estate* (Cambridge, Mass.: Harvard University Press, 1967); Sapolsky, Harvey M., *Science and the Navy: The History of the Office of Naval Research* (Princeton: Princeton University Press, 1990); and Gilpin, Robert and Wright, Christopher (eds), *Scientists and National Policy-Making* (New York: Columbia University Press, 1964). For a good, short survey of the role scientists themselves thought they played, see "The *Bulletin* and the Scientists' Movement", *Bulletin of the Atomic Scientists*, XLI (December 1985), pp. 19–30.

important to recognise the heights to which scientist-advisers had risen. Their role in developing radar and the proximity fuse made them vital to the war effort, and the Manhattan Project gave them unprecedented prominence. While technological development had long had substantial effects on the conduct of wars,[3] it was not until the immediate postwar period that those who developed the technology played an important role in determining its uses.[4] Reflecting a view epitomised in Vannevar Bush's *Science—The Endless Frontier* published in 1945,[5] many scientists anticipated a continued role for science in advancing American interests. In the aftermath of the war, scientists made important formative contributions to defence policy in pushing for the internationalisation of nuclear weapons, driving the decision to pursue the thermonuclear bomb, and shaping the response to Sputnik I.[6]

Since scientists' understanding of technological issues was unparalleled, it seemed natural that they should participate in decisions regarding the use of existing technologies and the development of future ones. But there were other reasons for the American reliance on scientist-advisers in this period. Some argued that scientists had particular intellectual characteristics and methodological predilections that made them especially valuable as policy advisers. They were valued for their independence and optimism about solving problems.[7] Their methodological training encouraged them to address issues through a "whole problem approach" that forced them to think more broadly about the sources of problems.[8] However, not all aspects of the scientific attitudes were thought to favour positive contributions to defence policy-making. One expert argued that scientists find it difficult to conceptualise countermeasures and have problems in considering large degrees of uncertainty in the complex systems that make up the subject of defence policy.[9]

Civilian scientists contributed to policy-making through a variety of channels. The President's Science Advisory Committee (PSAC) provided advice directly to the president. Established in 1957, the committee was the formal culmination of a variety of informal relationships that had served the president

[3] Van Creveld, Martin L., *Technology and War: From 2000 B.C. to the Present* (New York: Free Press, 1991); McNeill, William H., *The Pursuit of Power: Technology, Armed Force, and Society since AD 1000* (Chicago: University of Chicago Press, 1982).

[4] Lakoff, Sanford A., "Scientists, Technologists, and Political Power", in Spiegel-Rösing, Ina and de Solla Price, Derek (eds), *Science, Technology and Society: A Cross-Disciplinary Perspective* (Beverly Hills: Sage Publications, 1977), p. 355; Bernard Brodie, "The Scientific Strategists", in Gilpin, R. and Wright, C. (eds), *Scientists and National Policymaking, op. cit.*, pp. 240–256.

[5] (Washington, DC: National Science Foundation, 1945).

[6] See Kaplan, Fred, *The Wizards of Armageddon* (Stanford: Stanford University Press, 1983); and Rhodes, Richard, *Dark Sun: The Making of the Hydrogen Bomb* (New York: Simon & Schuster, 1995).

[7] On the former, see Wood, Robert C., "Scientists and Politics: The Rise of an Apolitical Elite", in Gilpin, R. and Wright, C. (eds), *Scientists and National Policymaking, op. cit.*, pp. 41–72. On the latter, see Skolnikoff, Eugene B., *Science, Technology, and American Foreign Policy* (Cambridge, Mass.: MIT Press, 1967), pp. 241–242.

[8] Schilling, Warner R., "Scientists, Foreign Policy, and Politics", in Gilpin, R. and Wright, C. (eds), *Scientists and National Policymaking, op. cit.*, pp. 155–157.

[9] Wohlstetter, Albert, "Strategy and the Natural Scientists", in *ibid.*, pp. 192–203 and 203–217.

previously. Other frequent vehicles for scientific advice were "summer studies". These brought together several dozen accomplished scientists to focus on a particular problem for a few months. The resulting report would be circulated among interested mid-level and senior bureaucrats and politicians. Civilian scientists also served on a wide range of advisory and oversight committees in, for example, the Office of Naval Research and the Defense Science Board.[10] Finally, personal contacts existed among scientists, senior government officials and high-ranking military officers that allowed certain outside scientists to play an *ad hoc* role in particular policy-makers' deliberations. Assessing the influence of these many channels was summarised in 1964 by one scholar: "Today natural scientists serve in the federal bureaucracy as policy advisers, public administrators, diplomats, and technological innovators; in these roles they exert a considerable influence on the formulation of many aspects of policy."[11]

However, in the late 1960s and early 1970s all this changed. The role of scientists in policy-making in the United States decreased markedly and changed in nature. The primary formal mechanism for advice—the President's Science Advisory Committee—was disbanded.[12] A number of outside scientific advisory committees began to question their proper role in the policy process—for instance, that which oversaw the Office of Naval Research.[13] An article in the leading scientific journal proclaimed: "Science under Nixon: Influence Has Declined in National Affairs."[14] One scholar lamented the scientists' "autumn of power":

> Government seems to have digested the sudden intake of these professionals, fitted them into the decision-making process, and now treats their handiwork with diminishing reverence and more realism. Science has joined practical politics, law, administration, economics, and military affairs as one more ingredient to consider in public business.[15]

To some extent, the role of the scientist-advisers merely shifted: away from direct advice to the executive branch and towards public education campaigns and testimony before congress.[16] Examples can be seen in the debates over the ill-fated supersonic transport, the ABM systems of the late 1960s and early

[10] Brooks, Harvey, "The Scientific Adviser", *in ibid.*, pp. 73–95.

[11] Gilpin, Robert, "Introduction: Natural Scientists in Policy-Making", in *ibid.*, p. 7.

[12] PSAC was officially demoted to outside the White House on 30 June, 1973. While it was later reinstated, it never regained the status that it had in the 1950s and 1960s. See Smith, B.L.R., *The Advisors, op. cit.*, ch. 8.

[13] Sapolsky, Harvey M., *Science and the Navy, op. cit.*, pp. 106ff.

[14] Greenberg, D. S., "Science under Nixon: Influence Has Declined in National Affairs", *Science*, CLXIX (September 1970), pp. 1056–1057.

[15] Sanders, Ralph, "The Autumn of Power: The Scientist in the Political Establishment", *Bulletin of Atomic Scientists*, XXII (October 1966), p. 22.

[16] Casper, Barry M., "An Appeal to Physicists", *Bulletin of the Atomic Scientists*, XL (1984), pp. 9–13; Primack, Joel and Von Hippel, Frank, *Advice and Dissent: Scientists in the Political Arena* (New York: Basic Books, 1974); Trenn, T., *America's Golden Bough, op. cit.*, p. 100.

1970s, and the Star Wars programme. Nevertheless, it is clear that this role in policy-making was second-best in the minds of the scientists themselves.[17]

Changing social and cultural expectations about science, and about epistemological questions more generally, encouraged this decline. The elitism in advice on science that seemed warranted in the 1950s and early 1960s was out of place by the 1970s. Bruce Smith, a leading scholar of science in policy, describes the period from 1966 to 1978 as one characterised by "a questioning of many assumptions of the first phase. A darker vision replaced the innocence and optimism".[18] In a constructivist look at the socio-cultural environment in which scientists—and science more generally—had played a role in policy-making, Ezrahi expands on this change in mood towards science, arguing that an "'instrumental concept of politics,' which encouraged the receptivity in America—and some other liberal democracies—to scientific and technological paradigms of public action, especially between the closing decades of the nineteenth century and the late 1960s, has been discredited toward the end of this century with profound consequences for the role of science and technology in the modern liberal-democratic state".[19] He notes that "the Icarian dream of flying on toward a 'knowledgeable society' in which ideology and politics are replaced by technically rational choices approved by an informed public, may have lost its earlier hold upon the political imagination".[20] The rejection of some aspects of the concept of "modernity" in general and the shifting role of science in culture and society in particular both contributed to the decline of civilian scientific advice.

Other, more mundane political factors were also important. First, the Vietnam war had tremendous influence. In general, many viewed academia as dovelike on the war. One analyst wrote, "Perhaps the greatest influence was the cumulative effect of the years of strain between the White House and the academic and intellectual community over the Vietnam War".[21] Regardless of which administration was in the White House, there was friction between the president and what was perceived to be a liberal academy.

Second, the civilian scientist-advisers felt increasingly disillusioned with their role. A typical study argues that "the spectrum of other devices by which the federal executive branch's science advisory system has been abused", and notes in disgust that "an advisory committee can be manipulated so that it adapts its advice to the political needs of the official being advised".[22] One

[17] For others with a profoundly disheartened tone, see Price, Don K., "Money and Influence: The Links of Science to Public Policy", *Daedalus*, CIII (Summer 1974), pp. 97–113; Beckler, David, "The Precarious Life of Science in the White House", in *ibid.*, pp. 115–134; and Long, F. A., "Scientists in Foreign Affairs: Where Do We Go Now?", *Bulletin of Atomic Scientists*, XXIII (March 1967), pp. 14–18.

[18] Smith, B. L. R., *American Science Policy since World War II, op. cit.*, p. 3.

[19] Ezrahi, Yaron, *The Descent of Icarus: Science and the Transformation of Contemporary Democracy* (Cambridge, Mass.: Harvard University Press, 1990), p. 15.

[20] *Ibid.*, p. 239.

[21] Beckler, D., "The Precarious Life of Science in the White House", *op. cit.*, pp. 127.

[22] Primack, J. and Von Hippel, F., *Advice and Dissent, op. cit.*, p. 34–35.

respondent to a large survey of scientist-advisers pled *mea culpa*: "we were certainly naïve to think that we could contribute anywhere near what we thought we could and naïve to think that our services would be demanded by the total government."[23]

Third, the Pentagon had long favoured a tight rein when dealing with any outside advice. In some sense, then, the period from the end of the Second World War to the Vietnam war was an aberrant period in which the Pentagon was unable to compete effectively with a set of outsiders. By 1964, the Pentagon had begun a process of "a nascent professionalization of the scientific advisory function", that is, of internalising formerly outside, independent advice.[24] Through the formation of the Directorate of Defense Research and Engineering and the Advanced Research Projects Agency, and the maturing of the Rand Corporation and the Institute for Defence Analysis, the Pentagon increasingly had internal and scientific advisers it could call upon who were thus beholden to it.[25] Because of this, the Defence Department was increasingly successful at limiting the independent voice of science in foreign policy-making.

> Initially, neither the military establishment nor the National Security Council possessed an in-house staff that could compare with PSAC. Thus it was inevitable that the President would look to PSAC for advice on both weapons and space technology, especially in dealing with the competitive claims of the military. But during this period [1957–63] the Pentagon staff continued to develop its scientific and technological expertise, enabling it to present increasingly strong cases for the technological systems they wanted. DOD under McNamara improved its own scientific advisory system to such a degree that it could compete successfully in disputes with PSAC over military policy.[26]

The McNamara Line project played an important role in causing this shift in the role of the scientist-advisers—indeed, a leading scholar in this field lists the McNamara Line as one the primary factors leading him to conclude that "Perhaps 1966 best marks the transition to the more troubled period".[27] It was one of the most prominent undertakings by the scientific community during the tumultuous period of the Vietnam war, and the amount of money spent was substantial, even by the Pentagon's standards. The disgruntlement felt by many of the project's leaders was made public and sparked reflection among the community of civilian scientists more generally. Its public failure—and its repudiation by the military—contributed to the societal disenchantment with an idealistic view of science as saviour.[28] While it may be too much to claim

[23] Eiduson, Bernice T., "Scientists as Advisors and Consultants in Washington", *Bulletin of the Atomic Scientists*, XXII (October 1966), p. 29.

[24] Gilpin, R., "Introduction: Natural Scientists in Policy-Making", *op. cit.*, p. 9.

[25] Sanders, R., "The Autumn of Power", *op. cit.*, pp. 22–25; Trenn, T., *America's Golden Bough, op. cit.*, p. 191.

[26] *Ibid.*, p. 62.

[27] Smith, B., *American Science Policy since World War II, op. cit.*, pp. 76–77.

[28] Dickson, Paul, *The Electronic Battlefield* (Bloomington: Indiana University Press, 1976) exemplifies this well.

that this project was the single causal event that soured relations between the scientists and the military, it clearly contributed to the fracturing of those relations.

In addition, other factors make it an attractive case to examine. First, this case occurs at precisely the time that the broader changes in the role of scientist-advisers were taking place. It also represents the heights of the scientists' aspirations to affect policy. A group of civilian scientist-advisers proposed a project that would have avoided the worst excesses of the Vietnam war. Furthermore, the scientists' impact on military policy in this case was quite substantial. At the same time, the eventual outcomes illustrate clearly the limitations of outside advisers in achieving their political goals. The project also consisted of a large scientific undertaking that served as a precursor to many of the technologies that form the basis of the continuing revolution in warfare. For instance, calls to heighten the effectiveness of present-day light infantry against heavy forces rely on sensor technologies which are linear descendants of those developed for the McNamara Line.[29] It should therefore interest military analysts concerned with the origins of the "electronic battlefield" of the twenty-first century.[30]

The McNamara Line: A Case Study

In 1966, the United States faced difficult and momentous decisions in Vietnam. Ever more was being asked of the country and her soldiers, yet the prospect of victory drifted further into the future. The central concern in the pre-Tet period of the Vietnam war was to stem the flow of supplies from North Vietnam to the Vietcong soldiers in the South. Traditional strategic interdiction campaigns—Rolling Thunder—had done little in this regard. However, relying on large increases in American ground forces for the task would have significantly expanded the American participation in this "peripheral" war. In contrast, if the problem of enemy infiltration could be resolved cheaply, American strategic goals would move within reach.

There was one promising strategy to stem that flow, win the war, and do so at an acceptable cost to the American people. Alternatively known as the McNamara Line, the Jason summer group proposal, the sensor barrier, the Dana Hall study, or Igloo White, this project aimed to check the infiltration of supplies and troops from the Ho Chi Minh Trail and other points north into South Vietnam. It relied heavily on new, scientifically advanced sensors to detect infiltration. Devastating new technologies of weaponry (both air-delivered and ground-based), as well as more traditional military methods, were to be responsible for stopping the flow of supplies. A group of civilian scientist-advisers made the proposal, hoping that the barrier could be used as

[29] See, e.g., the proposals in Steeb, Randall et al, *Rapid Force Projection: Exploring New Technology Concepts for Light Airborne Forces* (Santa Monica: Rand Corporation, 1996).

[30] For an early, and overstated, summary of this aspect of the McNamara Line project, see Dickson, P., *The Electronic Battlefield, op. cit.*

a means to allow the United States to de-escalate the war. The barrier as it was eventually implemented did nothing of the sort. Expanding variations on this project were pursued from 1967 and continued through to the end of 1972. They accounted for over $3 billion in spending.[31]

Origins of the scientists' role: On 13 January, 1966, Dr George Kistiakowsky, former science adviser to three presidents, sent a letter to President Johnson criticising American policy in Vietnam.[32] He argued that victory in Indochina would be extremely difficult to achieve, expressing particular pessimism about the current strategies of area sweeps and punitive bombing. In the letter he emphasised several factors—the role of technology, strategies for de-escalation, the efficacy of negotiations, and the bankruptcy of current policies—that would continue to motivate both himself and a number of other prominent scientists. Soon thereafter, several of them began meeting regularly, every few weeks, to discuss the deepening American involvement in Vietnam and possible alternative military strategies.[33] Although the membership of this "Cambridge Discussion Group" varied somewhat from meeting to meeting, the leading members were George Kistiakowsky, Jerome Wiesner, J.R. Zacharias, Carl Kaysen and Adam Yarmolinski. Others at least occasionally involved included John Kenneth Galbraith, Richard Neustadt and Henry Kissinger, among many more.

The premise of these meetings was that the creeping escalation in which the United States had already engaged was likely to continue but could and should be avoided. Much of the group's attention focused on alternative strategies to prevent the relentless growth in the involvement of the United States. One strategy that received substantial attention was "sealing" South Vietnam's borders. Additionally, much of the discussion at these early meetings was critical regarding the efficacy of bombing North Vietnam.

At the meeting on 19 March, J. R. Zacharias, one the leaders of the group, proposed that the scientists conduct a "substantial technical summer study" of possible options for the American role in Vietnam. By the meeting on 16 April, Yarmolinski had been in contact with the secretary of defence, Robert McNamara, and had persuaded him that such a study would be useful.[34] The draft proposal for this summer study group suggested the following objectives:

[31] On the cost figures see, Whitcomb, Darrel D., "Tonnage and Technology: Air Power on the Ho Chi Minh Trail", *Air Power History* (Spring 1997), pp. 4–17. Whitcomb's source on this figure is a newspaper article: "Resounding Success or Costly Failure?", *Philadelphia Inquirer*, 14 December, 1972. It is likely that the actual figure was indeed higher than that publicly reported in 1972 which is used here.

[32] Letter from George Kistiakowsky to President Johnson, Folder "Vietnam, 1963–68, 2 of 2", Box: HUG(FP)–94.18 "George Kistiakowsky: Correspondence and other Papers relating to the Vietnam War ca. 1963–1973", box 1, Biography and Faculty Papers Collection, Harvard University Archive. Hereafter Box: Vietnam, Kistiakowsky Papers, HUA.

[33] See various reports and minutes in folder "Cambridge Discussion Group", Box: Vietnam, Kistiakowsky Papers, HUA.

[34] "Minutes of CDG", 16 April, 1966, folder "Cambridge Study Group" [i.e., Cambridge Discussion Group], in d.

"To determine if there are possible technological innovations in military weapons and practices that could enhance the probability of achieving military objectives, consistent with our political objectives, in Vietnam at a lower cost."[35] During the early planning, geographic barriers and a wide variety of other possible strategies were put on the agenda. As time went on, however, the "technology of a 'fence' to isolate the South" became the primary strategy that the summer study group planned to evaluate.[36]

McNamara's Waning Confidence in Strategic Bombing

Precisely at this time McNamara's increasing disenchantment with the efficacy of strategic bombing was pushing him to look towards alternative strategies. Earlier in 1966, he began to question the military utility of strategic bombing.[37] The Air Force had convinced him that bombing petroleum, oil and lubricant (POL) sites in North Vietnam would bring the enemy to his knees.[38] The dual goals of the strategic bombing campaigns had always been to coerce the North Vietnamese into negotiations on terms favourable to the South and to limit infiltration into South Vietnam. However, by the autumn of 1966, McNamara concluded that strategic bombing was harming rather than increasing the prospects for negotiations. Instead of weakening North Vietnamese morale, McNamara became convinced that the campaign was bolstering the North's will-power.[39]

This perception by McNamara and others that strategic bombing was failing to achieve its objectives was critical to the development of the McNamara Line. From this perspective the McNamara Line did not actually have to stem infiltration; it would be successful if it provided the United States with political cover to de-escalate the strategic bombing campaign. McNamara believed that such de-escalation would allow negotiations with the North to move forward and serve the higher political and strategic goals of the United States.

The Summer Study Project

At the beginning of summer 1966, the group of scientists prepared to convene their working group under the aegis of the "Jason division" of the Pentagon's Institute for Defense Analysis. The connection with institute's

[35] "Draft Proposal", 13 April, 1966, folder "Summer Study, 1966", in *ibid.*

[36] "Tentative Briefing Schedule for IDA Study", 16 May, 1966, folder "Summer Study, 1966", in *ibid.*

[37] *The Pentagon Papers: The Defense Department History of the United States Decisionmaking on Vietnam, Vol. IV*, The Senator Gravel Edition (Boston: Beacon Press, 1971–72), p. 111ff. Hereafter Pentagon Papers. McNamara was aware that the CIA shared these concerns: *ibid.*, p. 137.

[38] Smith, John T., *Rolling Thunder: The American Strategic Bombing Campaign Against North Vietnam, 1964–68* (Walton on Thames: Air Research Publications, 1994), pp. 96ff.

[39] Interview with Carl Kaysen, Cambridge, Mass., 5 December, 1996; *Pentagon Papers, Vol. IV, op cit.*, p. 112; McNamara, Robert, *In Retrospect: The Tragedy and Lessons of Vietnam* (New York: Times Books, 1995), pp. 245–246.

Jason group was spurious, however. The affiliation with the group was an artificial construct to overcome logistical hurdles, for example, transfer of moneys, circulation of classified materials and avoidance of undue press attention.[40] Early in the summer the group of 47 civilian scientists met at Dana Hall, a suburban girls' school outside Boston, starting off with more than a week of high-level government briefings which included civilian, CIA and military experts.

Ideas flowed back and forth as the scientists debated various strategies. On the technical side, the group considered several ideas that were not eventually included in their proposal, for example, use of anesthesiological techniques for counter-insurgency and development of sensors to find trace amounts of gunpowder on a potential guerrilla soldier.[41] Throughout the discussions, the group was working towards some sort of barrier or fence as a way to stem infiltration and thus allow for a reduction of the counterproductive strategic bombing campaign and a reduction in the role of the United State in the war.

By August, the scientist-advisers were ready to present their final report.

The final report of the summer study group: The summer study group presented several different papers with mutually supporting conclusions: strategic bombing had been ineffective, thus justifying their recommendation of the barrier concept.[42] One paper focused on the effectiveness of the United States' bombing in North Vietnam. It concluded that it was not causing supply problems for the North Vietnamese Army (NVA) or the Vietcong since Soviet and Chinese support simply increased to meet any deficiencies. Furthermore, it found no evidence that the bombing negatively affected the will-power of North Vietnam to continue the war: "The indirect effects on [*sic*] the bombing on the will of the North Vietnamese to continue fighting and on their leaders' appraisal of the prospective gains and costs of maintaining the present policy have not shown themselves in any tangible way."[43]

Another paper presented the scientists' solution to these problems: "An Air Supported Anti-Infiltration Barrier." Finding past efforts at stemming infiltration to be functionally ineffective, the group investigated what could be done using technology that already existed or would soon be available. They proposed a system "based on Gravel mines for 'area denial,' profuse use of simple sensors constantly monitored to detect attempts at penetration, and air

[40] Interview with Jack Ruina (the president of IDA), Cambridge, Mass., December 1997.

[41] "Tentative Thoughts about Infiltration Barriers", JSSE-Int-30, 24 June, 1966. Also see JSSE-Int-32. Both in folder "Summer Study, 1966", Box: Vietnam, Kistiakowsky Papers, HUA.

[42] *Pentagon Papers, Vol. IV, op. cit.*, p. 116ff.

[43] Group 1, Institute for Defense Analysis, "The Effects of U.S. Bombing on North Vietnam's Ability to Support Military Operations in South Vietnam and Laos: Retrospect and Prospect", "IDA TS/HQ 66–49," 29 August, 1966 (Washington DC: Institute for Defense Analysis, 1966a), p. viii, Lyndon B. Johnson Presidential (hereafter, LBJ) Library #94–92. Also available on microfiche as Document 1877, Year 1997 from Research Publications, "An Imprint of Primary Source Media" (Woodbridge: 1997). Hereafter Research Publications.

strikes with area-type weapons against detected targets".[44] It would cut both cross-border infiltration trails and, more importantly, the Ho Chi Minh Trail. A Gravel mine was a "three inch cloth bag containing powder plus two plastic pellets. The device was undetectable to standard mine detectors, and the pellets were invisible on X-rays. Every wound would have to be treated by exploratory surgery".[45] Button bomblets—small aspirin-sized charges that were aimed to make noise, and not necessarily to injure—would increase the range of acoustic sensors for foot traffic.[46] For sensors the group suggested use of a modified Navy anti-submarine warfare sonobouy, which later became known as Acoubuoy. When configured for land use, it was estimated that the sensor would hear trucks up to 2,000 feet and foot traffic to 200 feet, when combined with the use of button bomblets. Targets would be attacked with cluster munitions that spread some 600 anti-personnel/anti-vehicle bomblets over an area with a radius of some 400 feet.[47]

The proposed barrier would consist of a 30 km manned fence—a physical barrier—in the east ranging from the South China Sea along the south edge of the demilitarised zone (DMZ) to the rugged Annamite Mountains. From there it would continue into Laos primarily as a wide "denial field", i.e., a series of huge mine and sensor fields. This western denial field would consist of both an anti-vehicle element and an anti-personnel element. Given the extremely dense vegetation and uneven terrain, it was virtually impossible to travel without at least a footpath, and it was assumed that within the denial field most of the trails (either vehicle or foot) could be identified. All trails and roads would be heavily saturated with sensors. This entire strategy would depend on daily photo-reconnaissance over the barrier area to identify new trails.

The group clearly anticipated an action-response cycle over the barrier—a "battle of the barrier". The North Vietnamese would be likely to respond to the barrier with countermeasures; the United States would adjust the barrier to address these; and so on.[48]

Viewpoints on the Proposal

Once the proposal was formally presented to the Pentagon, both the military and the bureaucrats rapidly lined up either in support of or in opposition to the programme. While select political advisers supported the programme, it is fair to characterise this project as "McNamara's baby". It was he who overruled the Joint Chiefs of Staff in beginning the project in 1966;[49]

[44] Institute for Defense Analyses (IDA), Jason Division, "Air Supported Anti-Infiltration Barrier", Study S-255, August 1966 (Washington, DC: IDA, 1966b), LBJ Library, NLJ #xx10 (available as Document 3097, Year 1990, Research Publications, *op. cit.*).

[45] Prados, John and Stubbe, Ray, *Valley of Decision: The Siege of Khe Sanh* (New York: Dell Publishing, 1991), p. 160. See also IDA, "Air Supported Anti-Infiltration Barrier", *op. cit.*, p. 29.

[46] *Ibid.*; and IDA, "Air Supported Anti-Infiltration Barrier", *op. cit.*, p. 30.

[47] *Ibid.*, p. 30–32.

[48] *Ibid.*, p. 27.

[49] *Pentagon Papers, Vol. IV, op cit.*, p. 124.

he who first briefed the president on it;[50] he who announced it publicly the following year;[51] and he who was the project's most vigorous supporter on the Hill.[52]

In contrast, the programme had few "uniformed" supporters. Once the summer study group's proposal was circulated in the early autumn of 1966, the military was quick to pounce. Admiral Sharp, Commander-in-Chief, Pacific Command, had responded rather strongly against a related proposal: he suggested that it would require some seven or eight divisions to man and three to four years to complete. Furthermore, and on a point that resonates throughout the military in regards to this project, Sharp noted that this obstacle system would disadvantage United States forces by restraining them in static defensive positions rather than allowing them to attack at places of their choosing.[53] General Wheeler, chairman of the Joint Chiefs of Staff, also feared that such a barrier might be a tactical success but a strategic failure, with the enemy simply refocusing his supply efforts to coastal routes and Cambodia.[54] Sharp and Wheeler were not alone. A selection of other officers' testimony makes this clear: "From the very beginning I have opposed this project"; "it is like closing the window and leaving the door open"; "I think it is going to have minimum effectiveness for the cost that has been associated with it"; and it is "one of the most preposterous concepts of this singular war".[55]

The task of manning the fixed barrier would fall to the Third Marine Amphibious Force (III MAF). Although true of all American forces at the time, the Marines in particular were not enthusiastic about being tied down to fixed positions. When the force eventually began preparation of their tactical plan, their commander "stipulated . . . that the division's plan should begin with a statement that III MAF disagreed with the whole barrier idea and preferred to use the same forces in mobile operations, as it was already doing".[56] His operations officer stated "All of the barrier plans are fantastic, absolutely impractical, and III MAF is opposed to all because of engineer requirements . . . and the installations must tie down troops to protect the

[50] *Ibid.*, pp. 126, 349.

[51] Prados, J. and Stubbe, R., *Valley of Decision, op. cit.*, p. 165.

[52] Testimony, "Air War Against North Vietnam", Committee on Armed Services, US Senate, 25 August, 1967.

[53] Prados, J. and Stubbe, R., *Valley of Decision, op. cit.*, p. 159; *Pentagon Papers, Vol. IV, op. cit.*, pp. 112ff, 123; and Tefler, Maj. Gary and Rogers, Lt.-Col. Lane, *U.S. Marines in Vietnam: Fighting the North Vietnamese, 1967* (Washington, DC: History and Museums Division, HQ, US Marine Corps, 1984), pp. 86ff.

[54] Van Staaveren, Jacob, *Interdiction in Southern Laos, 1960–1968*, United States Air Force in Southeast Asia (Washington, DC: Center for Air Force History, 1993), p. 257.

[55] General Greene, Commandant of the Marine Corps, Testimony, "Air War Against North Vietnam", Committee on Armed Services, US Senate, 29 August, 1967; Army's Chief of Staff, Testimony, "Air War Against North Vietnam", Committee on Armed Services, US Senate, 29 August, 1967; and Davidson, Phillip B., *Vietnam at War: The History, 1946–75* (Novato: Presidio Press, 1988), p. 391.

[56] Prados, J. and Stubbe, R., *Valley of Decision, op. cit.*, p. 161.

barrier".[57] Finally, since the demilitarised zone was in relatively unpopulated territory, stationing the Marines there would take them away from the population centres and the task of "pacification" which their generals considered vital.[58]

More generally, many of the senior military leaders questioned the cost-benefit analysis of this project in comparison to other operations. General McConnell, Chief of Staff of the United States Air Force, pleaded that "at least some" of the money allocated to the project be spent elsewhere.[59] The operation under way that most interested many of the military leaders was the strategic bombing campaign, and it was primarily concern for this programme that fuelled McConnell's opposition to the barrier. In responding to this concern, the services conducted a substantial analysis which called into question the validity of the summer study group's conclusions on the efficacy of the strategic bombing campaign.[60] The military made clear their views on Capitol Hill: "It will never be a substitute for the bombing."[61]

A partial exception to the military's staunch opposition to the programme was the attitude of General Westmoreland, Commander of United States forces in Vietnam, who was willing to support the eastern, physical part of the barrier. In accounting for this preference, "Westy" himself writes, "I still hoped some day to get approval for a major drive into Laos to cut the Ho Chi Minh Trail".[62] The McNamara Line would allow him to maintain a substantial military presence in northeastern South Vietnam, including the base at Khe Sanh. This would be vital should Washington ever permit an invasion of Laos.

Implementation of the Scientists' Proposal

Despite overwhelming military opposition, McNamara prevailed because, in short, he was the secretary of defence. For more than a year, the scientist-advisers' proposal was implemented, haltingly and incompletely to be sure, but more or less as they had suggested. Soon thereafter, however, the technologies, tactics, organisations and budgets that had come from their proposal were redirected in a manner entirely inconsistent with their goals.

Initial positive signs: Once McNamara had decided to proceed with implementation of the scientists' proposal, he appointed Lt.-Gen. Alfred Starbird to

[57] Shulimson, Jack, *US Marines in Vietnam: An Expanding War, 1966* (Washington, DC: History and Museums Division, Headquarters, US Marine Corps, 1982), p. 319.

[58] Prados, J. and Stubbe, R., *Valley of Decision, op. cit.*, p. 52.

[59] Testimony, "Air War Against North Vietnam", Committee on Armed Services, US Senate, 22 August, 1967.

[60] For one example, see R.N. Ginsberg, Memorandum for Mr Rostow, "Jason Study on US Bombing in North Vietnam", 13 September, 1966, LBJ Library, NLJ #84–290 (available as Document 148, Year 1986, Research Publications, *op. cit.*). See also *Pentagon Papers, Vol. IV, op. cit.*, p. 132, for a response from the Joint Chiefs.

[61] Admiral Sharp, Testimony, "Air War Against North Vietnam", Committee on Armed Services, US Senate, 9–10 August, 1967.

[62] Westmoreland, Gen. William C., *A Soldier Reports* (New York: De Capo Press, 1979), p. 198.

head the project within the Directorate of Defense Research and Engineering in the Pentagon in mid-September 1966.[63] In December, McNamara asked for a budgetary plan from Starbird's fledgling "Defense Communications Planning Group" (DCPG), and in early January, that group was given the highest national priority for procurement.[64] The air-seeded portion of the barrier, i.e., the sensors and mine/strike aircraft, was assigned a code word: Igloo White.

By March 1967, work on the project *per se* was well under way. The final military implementation plan for the "strong point obstacle system" called for a very dense set of fortifications in the lowlands in the east, backed up by an armoured brigade and more selective positions in the more forested west, manned by an infantry division. Preplanned artillery targets would support the entire barrier.[65] By May, the initial cleared trace—200 metres wide at the time—had been completed for some 10 kilometres.[66] Through summer construction continued, and specific units began to be considered for eventual deployment to the barrier.

Throughout this period, military opposition to the plan remained: "to sum it all up, we're not enthusiastic over any barrier defense approach to the infiltration problem."[67] The *Pentagon Papers* summarised Westmoreland's first major military study of the plan derisively:

> [He] was protecting plans already approved and rolling . . . [he] envisioned a strong point and obstacle system constructed on the eastern portion of northern Quang Tri Province . . . [he] also indicated a preference for extension of the strong point/obstacle system into the Western Sector instead of reliance on air delivered munitions and sensors.[68]

Later that summer McNamara again visited Vietnam. He was quite impressed with progress on strong points. So much so, in fact, that he announced the barrier in a press conference upon his return on 8 September, 1967.[69] However, soon the Marines building and manning the barrier along the demilitarised zone faced significantly increased pressure from the enemy—in particular, from heavy artillery. Although some blamed McNamara's announcement for this,[70] such an accusation is unwarranted: the timing does not support it. According to official, declassified reports, the pressure reached a peak in mid-August so had been rising even before that.[71] Additionally, on 7

[63] *Pentagon Papers, Vol. IV, op. cit.*, p. 140.

[64] Prados, J. and Stubbe, R., *Valley of Decision, op. cit.*, 162. See also Van Staaveren, J., *Interdiction in Southern Laos, 1960–1968, op. cit.*, p. 267.

[65] Tefler, G. and Rogers, L., *U.S. Marines in Vietnam, op. cit.*, p. 87.

[66] *Ibid.*, p. 89.

[67] Quote from a briefing officer of III MAF to the Undersecretary of the Navy. *Ibid.*, p. 88.

[68] *Pentagon Papers, Vol. IV, op. cit.*, p. 413. This refers to "JCSM-97–67, PRACTICE NINE Requirements Plan".

[69] Prados, J. and Stubbe, R., *Valley of Decision, op. cit.*, pp. 164–165.

[70] This is the implication of Westmoreland, Gen. W. C., *A Soldier Reports, op. cit.*, p. 200.

[71] USMACV, *Command History, Volume III, 1967*, Military History Branch, Office of the Secretary, Joint Staff, Headquarters, USMACV, APO San Francisco 96222, Saigon Vietnam, 1968, p. 1095; Miscellaneous Fiche-Technical Information, MACV through MACV: Training, Logistics, Service; Box 5; Records of the United States Forces in Southeast Asia, 1950–1975, Record Group 472; National Archives, Washington DC (hereafter, Misc. Fiche, NARA). See also Tefler, G. and Rogers, L., *U.S. Marines in Vietnam, op. cit.*, p. 92.

September, the day before McNamara's press conference Westmoreland "directed CG III MAF to prepare an alternate plan for development of the SPOS, taking into account the increased enemy artillery capabilities and their effect on the construction and security forces".[72] Following this increase, and new casualty figures for the project, in early September the scale of the physical barrier of strong points began to be scaled back.[73]

Once the project for the McNamara Line was formally approved in the early autumn of 1966, the development of the technology needed for the air-seeded portion of the barrier under the Defense Communications Planning Group accelerated. In addition to developing several new munitions, the DCPG developed a number of sensors to supplement the Acoubuoy suggested by the summer study group. The most commonly deployed of these was the air delivered seismic intrusion device or ADSID: "a miniature seismometer capable of recording minute vibrations."[74] Numerous variations on these different sensors—for example, ACOUSID, HANDSID, HAID, PSID—were developed by the DCPG in 1967. Some had "spikes" that stuck into the ground, others were intended to get caught in and hang from the jungle canopy, et cetera.

Another important component of the McNamara Line was the signal relay system: target signals had to be relayed from the sensors to a central location, and then to specific planes for strike orders. The central location was a base in Nakhon Phanom, Thailand. Staffed by some 400 Americans and led by General William McBride, this huge facility served as the nerve centre for the Igloo White project.[75] Sensor tracks were monitored using sophisticated IBM computers and promising targets were identified. Then patrol aircraft or forward observers would be asked to make a visual confirmation, and if that confirmation was forthcoming strike aircraft would be vectored to the target.[76]

After numerous delays and last-minute changes, on 1 December, 1967, the anti-vehicular portion of Igloo White moved into action.[77] Several hundred sensors were deployed, in "strings" of four to six sensors each, throughout the region. In the first week of operation some 38 targets were passed on to the EC-121s, leading to an equal number of strike missions. Unfortunately, only four of these fighter-bombers found their targets, and only two hit them. One

[72] USMACV, *Command History, 1967, op. cit.*, p. 1097.

[73] Operation Plan 12–67, approved on 9 October, 1967, was a less ambitious engineering task than either than that proposed by the Jason summer study group or that initially approved by McNamara and Westmoreland as Op Plan 11–67. See Tefler, G. and Rogers, L., *U.S. Marines in Vietnam, op. cit.*, p. 93.

[74] Prados, J. and Stubbe, R., *Valley of Decision, op. cit.*, p. 341.

[75] Van Staaveren, J., *Interdiction in Southern Laos, 1960–1968, op. cit.*, pp. 270ff.

[76] Prados, J. and Stubbe, R., *Valley of Decision, op. cit.*, p. 160. For the purpose of these visual confirmations, the Igloo White programme was initially allocated some 18 F-4s, 21 EC-121s, and over 30 observation planes (light O-2s).

[77] Quantitative information in this paragraph computed from the first weekly report on the MUSCLE SHOALS system: "7th Air Force JOPREP JIFFY Report on MUSCLE SHOALS for 12/1/67 to 12/7/67", LBJ Library, NLJ #89–178 (available as Document 3079, Year 1991, Research Publications, *op. cit.*).

problem became clear early: "there were rather few strike aircraft responses because other or higher priority targets were available."[78] The requirement for visual target confirmation by a local forward air controller (FAC) also hampered the operation. Finally, there were problems with sensor accuracy, reliability and availability.[79] Regarding the anti-personnel system a chronic problem was noted: "Results in [the anti-personnel subsystem] cannot be assessed since observation necessary to provide estimates of battle damage are [*sic*] impossible."[80]

In late December, signs of North Vietnamese Army countermeasures already appeared. The "battle of the barrier", as predicted by the summer study group, was being waged. The Air Force's summary report for that period notes: "Data relative to large number of sensor generated tracks opposed to those visually confirmed during daylight hours indicate an enemy ground observer warning system may be providing sufficient warning to enable trucks to conceal themselves from FACs and strike aircraft."[81]

Nevertheless, at this point various progress reports and programme reviews expressed fairly optimistic views.[82] The barrier's strike planes hit some 40 trucks in December and a further 79 in January.[83] Following a lull during the battle of Khe Sanh, in April the number of the trucks hit was again in the range of 20 to 40.

Khe Sanh had been draining resources from the project. After the battle there, the local commander testified to Congress that twice as many Marines would have been killed in the siege but for the Igloo White systems redeployed to the base's perimeter.[84] The diversion of Igloo White resources to Khe Sahn was the first instance of what was to become a common occurrence. Materials, technologies and tactics which the scientists had hoped would be used on the barrier were instead diverted to other purposes which had greater support from the military.

Subsequent debasement of the scientists' proposal: "I do not know to this day whether I quit or was fired."[85] Either way, McNamara left office as secretary of defence on 29 February, 1968. In summer 1968, the McNamara Line died. By

[78] Van Staaveren, J., *Interdiction in Southern Laos, 1960–1968, op. cit.*, p. 279.

[79] *Ibid.*, p. 282. See chart 6 in Lt.-Gen. John Lavelle, Director, DCPG, "Briefing for the Joint Chiefs of Staff", 25 November, 1968, LBJ Library, NLJ #CBS–5.

[80] "7th Air Force JOPREP JIFFY Report on MUSCLE SHOALS for 3/7/68 to 3/14/68". LBJ Library, NLJ #91–334 (available as Document 3079, Year 1991, Research Publications, *op. cit.*).

[81] "7th Air Force JOPREP JIFFY Report on MUSCLE SHOALS for 12/21/67 to 12/31/67", LBJ Library, NLJ #89–178 (available as Document 3079, Year 1991, Research Publications, *op. cit.*).

[82] See, e.g., "Monthly briefing to the Secretary of Defense on the DCPG Program", 21 December, 1967, LBJ Library, NLJ #89–217 (available as Document #3158, Year 1992, Research Publications, *op. cit.*), esp. p. 6. See also Donald Cotter, "Memorandum for the Director of Defense Research and Engineering; Subject: Quick Look at MUSCLE SHOALS Effectiveness", 16 January, 1968, LBJ Library, NLJ #89–177.

[83] Van Staaveren, J., *Interdiction in Southern Laos, 1960–1968, op. cit.*, p. 291.

[84] Prados, J. and Stubbe, R., *Valley of Decision, op. cit.*, p. 344.

[85] McNamara, R., *In Retrospect, op. cit.*, p. 311.

June, Khe Sanh and Lan Ro Du combat bases were abandoned. Three months later the new commander in Vietnam "ordered all construction and planning efforts associated with the present [strong point obstacle system] to be halted pending further guidance".[86] In October the anti-infiltration programme was given a new orientation: "to improve the capability of US and [free world] forces deployed in northern I Corps to detect the movement south of major NVN forces that have withdrawn from the DMZ area".[87] This new goal was in marked contrast to the previous aim of slowing the infiltration of supplies and troops.

However, while the concept of a linear barrier as envisaged by the scientists was indeed abandoned, the sensors, weapons and even the tactics that had been developed in conjunction with their programme continued to be used in ever-expanding efforts both in-country and in a widened area along the Ho Chi Minh Trail. The scientists' original goal of paving a road towards de-escalation was lost on military leaders who saw this system as yet another tool to use at their disposal.

In-country Programmes

At the orders of Admiral Sharp, Operation Duffle Bag began in April 1968.[88] It called for the use of "[Igloo White] resources, other than to impede overland infiltration from NVN to SVN, in operations against enemy force in SEASIA". The military began testing the sensors in tactical situations such as "Combat sweep . . . Ambush . . . Base defences; and . . . Monitoring of [landing zones]".[89]

Thus, the Igloo White sensors became just another set of tools to pursue the war as it had traditionally been fought. After positive results in initial testing, their use spread dramatically in-country. The examples below are drawn from unit histories using these new technologies:

> Sensors had produced numerous indications of enemy troop movements and locations in [the Third Marine Division's operational area] which were confirmed by aerial observer, agent and POW reports. In one area where a high activity rate was reported, a recon patrol called in artillery which produced 159 secondary explosions and 15 fireballs. In another instance, four secondary fires resulted from two missions fired in response to sensor activations. Sensory information in conjunction with other indicators prompted initiation of a regimental size operation which resulted in numerous sightings and several contacts.[90]

> Sensors were emplaced next to a suspected enemy LOC [lines of communication]. Artillery fired on activations. Aerial scouts observed and reported remnants of enemy

[86] USMACV, *Command History, Vol. II, 1968* (Military History Branch, Office of the Secretary, Joint Staff, Headquarters, USMACV, APO San Francisco 96222, Saigon Vietnam), 1969, pp. 917; Misc. Fiche, NARA.

[87] Fact Sheet, "Subject: COMUSMACV's Proposed Anti-infiltration Program", 24 October, 1968, prepared by Col. L. C. Hoyt, Pacific Division, J-3, LBJ Library, NLJ #91–334.

[88] Duffle Bag was originally known as Duck Blind (from April–October 1968).

[89] USMACV, *Command History, 1968, op. cit.*, pp. 926–927.

[90] *Ibid.*, p. 932.

activity. An infantry sweep an hour later located five NVA KIA by artillery, and picked up the following equipment: one AK-47, six AK magazines, seven NVA packs, 10 HGs, 100 lbs rice, six rds RPG-2 and one pound documents.[91]

In comparing the overall use of the sensors, military statistics make clear that operations within South Vietnam took priority.[92] Duffle Bag received nine times as many sensors as the McNamara Line. While the Duffle Bag sensors were activated only a quarter as often, they were three times as likely to lead to strikes as those on the Line.

By 1968 the Defense Communications and Planning Group was increasingly developing technology that was not directed at the barrier but rather at supporting the in-country effort more generally. For instance, the Person Delivered Seismic Intrusion Detector, developed by the DCPG, was small enough to be carried and used by squad-sized patrols and was monitored, in its most common configuration, by nearby troops.[93] Neither of these elements would be particularly useful in the air-seeded anti-infiltration barrier. However, both would be valuable in ambush or "search and destroy" missions or securing the perimeter of small bases. Similarly, another DCPG-developed technology, the Ground Surveillance Radar (AN/PPS-5), was used primarily by non-Marine units—thus they were not used in the barrier area. (The military rejected the development of a 360-degree version of this radar as unnecessary since "in conventional warfare there will be an established FEBA with the prime area of coverage being immediately to the front."[94] This seems at odds with their protestations about the outdated nature of the McNamara Line's underlying linear conception of warfare, and suggests the military were in fact disingenuous.)

Finally, when the head of the Defense Communications Planning Group visited Vietnam in March 1971, only two of the 27 meetings he attended focused on the linear barrier, while 15 pertained to Duffle Bag or units involved in it.[95]

[91] *Ibid.*, p. 931.

[92] Data calculated from figures in USMACV, *Command History, Vol. I, 1971* (Military History Branch, Office of the Secretary, Joint Staff, Headquarters, USMACV, APO San Francisco 96222, Saigon Vietnam), 1972, p. IV–3; Misc. Fiche, NARA.

[93] File: "PSIDs"; ENSURE Item Case Files, Box 23; Research and Development Division, US Army Concept Team in Vietnam (ACTIV), HQ, US Army Vietnam; Records of the United States Forces in Southeast Asia, 1950–1975, Record Group 472; National Archives, Washington DC.

[94] Memo, Subject: "360 Degree Scan Capability for Ground Surveillance RADA AN/PPS-5", dated 13 March, 1968, From Major R.S. Christian, US Army Combat Developments Command; File 1305–01/A-279 Scan Capability for Ground Surveillance Radar, AN/PPS-5; Action Item Case Files, Box 3; Research and Development Division, US Army Concept Team in Vietnam (ACTIV), HQ, US Army Vietnam; Records of the United States Forces in Southeast Asia, 1950–1975, Record Group 472; National Archives, Washington, DC.

[95] Itinerary, "Visit of Major General John R. Deane, Director, Defense Communications Planning Group", dated 17 March, 71; General Records, Advisory Division (MACJ61), Assistant Chief of Staff for Communications-Electronics (J6), HQ, MACV; Records of the United States Forces in Southeast Asia, 1950–1975, Record Group 472; National Archives, Washington, DC.

Continued Use of Igloo White to Combat Infiltration

Aside from this massive in-country effort, the sensors, weapons and tactics developed by the scientists went on being used in traditional interdiction strategies against the Ho Chi Minh Trail. This strategy continued, with a new code name and marginal changes in tactics, right to the end of the American military involvement in Indochina

The anti-vehicular portion of the project continued with particular vehemence. Rechristened the Commando Hunt campaign,[96] this programme was a major effort of the Seventh Air Force for several years beginning in 1968. It accounted for several hundred fighter-bomber sorties each year, and scores of heavy bomber and gunship sorties.[97] These American campaigns appeared moderately successful, at least according to the Air Force's own reckoning: throughput of supplies was reduced to 20 per cent, 33 per cent, 11 per cent, and 17 per cent of input in the campaigns from 1969 to 1972, respectively.[98] There are sound reasons to discount these truck destruction figures, however.[99]

But, even if one concludes that these campaigns were a tactical success, they were strategic failures. After several years of successful Commando Hunt campaigns, the North Vietnamese were able to provide logistical support for a substantial attack on South Vietnam, including the most intense use of mechanised forces seen to date in the Southeast Asian theatre. While the Easter offensive of 1972 was eventually beaten back by South Vietnamese forces, and to a lesser extent by United States forces, that the North Vietnamese had been able to undertake it at all points to the failure of the Commando Hunt campaign at a strategic level.

The technologically impressive command centre in Nakhon Phanom, Thailand, remained fully operational until the end of the war. A visit to the command room in 1973 was described thus:

> They went into a room with console after console. There was hardly anybody around. The airman pushed a switch, and out came the live sound of birds twittering a hundred miles to the east on the Ho Chi Minh Trail. Then the airman put on a tape recorded earlier that morning from another location. [They] heard voices speaking Vietnamese. With all its acoustic, seismic, and magnetic sensors, the U.S. Air Force had a pretty good idea where the North Vietnamese were on the Trail. It just had never been able to do much about them.[100]

[96] USMACV, *Command History, 1968, op. cit.*, pp. 926.

[97] See chart in Gilster, Herman L., *The Air War in Southeast Asia: Case Studies of Selected Campaigns* (Maxwell Air Force Base, Alabama: Air University Press, October 1993), p. 20.

[98] Figures throughout taken from *ibid.*, p. 20.

[99] See Whitcomb, D. D., "Tonnage and Technology", *op. cit.*, p. 16.

[100] This description describes a visit to the Thai command centre after the signing of the Paris Peace Accords for Laos on 21 February, 1973, and after the January 1973 agreement between the United States, North Vietnam and South Vietnam to end that war. Warner, Roger, *Shooting at the Moon: The Story of America's Clandestine War in Laos* (South Royalton: Steerforth Press, 1997), pp. 349–50.

Essentially, the scientists' ideas were implemented in a narrow, tactical military sense. Modifications on their original proposals were pursued in the Commando Hunt campaigns for years, with only limited operational results. Many of the technologies found a welcome home in numerous in-country operations. Disillusioned scientists had to watch while the project moved away from their political goal of limiting American involvement and paving the way for negotiations.

The Impact on the Scientists

Throughout the early testing and deployment of the barrier system, many of the scientists originally associated with the summer study group continued to work on the project with the Pentagon. Several continued their work through a formal association called "the DCPG Committee", while others continued to advise and be kept abreast more informally. The Defense Communication Planning Group and the Pentagon hosted a number of briefing trips for many of the scientists where they demonstrated aerial drops of munitions and sensors.[101]

However, even at this early stage a degree of disillusionment began to arise in many of the scientists. In part, this was due to foot-dragging by the military leadership over when to initiate the system; in military terms, this debate focused on the appropriate "date of initial operating capability" (the IOC). The military rationalised the delays by arguing that simultaneous initiation of the complete system would maximise its shock effect. In contrast, the scientists viewed the McNamara Line as an alternative to punitive bombing and one which would allow for negotiations. Thus for them, the sooner the barrier could be installed, the sooner the bombing programmes could be restrained.[102]

This disillusionment worsened in the later part of 1967. The DCPG committee discussed, although it did not send, a letter to the political leaders in the Pentagon recalling their original goals of "helping the US out of a bad situation in Vietnam". Continuing to complain, the draft notes that:

> [The group's members] feel strongly that the President has been acting on bad advice. The present policy is not working, and an objective view of the facts would indicate that it cannot work, at best, and at worst that it will lead to the nuclear holocaust of World War III . . . As one step in providing a means to reorient that policy, we have been working on this project. While we have felt a strong call to speak out publicly against current government policy, we are willing at the moment to continue our work silently in the hope that it may be one means of getting the US out of a collision course with disaster.[103]

[101] See "APGC Protocol Information," in folder "Defense Communications Planning Group", Box: Vietnam, Kistiakowsky Papers, HUA.

[102] See "Memorandum to the Files: Timing of the I.O.C. of the System", by George Kistiakowsky, 12 July, 1967, in folder "Vietnam, 1963–68, 1 of 2", in *ibid.*

[103] See document entitled "A Draft of a Statement by D. Caldwell that was to be Signed by the DCPG Committee, but never was", undated but apparently in late 1967, in folder "Defense Communications Planning Group", in *ibid.*

The profound disappointment of George Kistiakowsky—one of the leaders of the scientists—with the continuing slow progress on the project, and on its materialising role as a way to escalate the conflict rather than to diminish its intensity is apparent in several "memoranda to the files" that he wrote at this time.[104]

By late 1967, Kistiakowsky had become so disillusioned the he decided to not only resign from the DCPG, but sever all official ties with the Pentagon. On 15 January, 1968, two days after a DCPG committee meeting, he formally tendered his resignation. Most of the scientists on the committee supported his decision. One of them wrote to Kistiakowsky, emphasising the breadth of the disappointment with their project:

> I recall telling you, one morning before one of our meetings, that I was not interested in helping with a project that would be used merely as an additional escalatory step, and that I felt that the administration had no interest in using the DCPG effort in the way all of us had originally hoped it would be used, as a part of a general de-escalation of the war. You said you felt the same way, and I know that all but at most one or two of the other members of the committee did too.[105]

There was substantial attention to Kistiakowsky's departure in the press.[106] Within a few months of his retirement, most of the scientists originally involved in the project had joined him in severing their ties with the DCPG.

Explaining the Outcome

There are two explanations for the débâcle. The first looks to the strategic naïveté of the scientist advisers. The evidence raised above suggests the plan proposed by the summer study group was implemented tactically, and in a manner broadly consistent with that recommended by the scientists. The substantial truck destruction totals should have both destroyed large amounts of logistical material that would have otherwise been used against American and South Vietnamese forces, and raised North Vietnam's costs of supplying its military—i.e., even the "battle of the barrier" was not cheap. Either result should have been sufficient for achieving the scientists' original goal of stemming the increase in the American role in the war and finding a politically expedient "exit" from the worrying trend of increasing escalation. That strategic goal was never achieved.

There are three possible explanations for this failing. Only one is fully convincing. A first might point to the low amounts of supplies the Vietcong and the North Vietnamese Army needed in South Vietnam. This was a highly

[104] See "Memorandum to the Files: Uses of the Barrier", and "Memorandum to the Files: Timing of the I.O.C. of the System", both by George Kistiakowsky, 7 December, 1967, in folder "Vietnam, 1963–68, 1 of 2", in *ibid.*

[105] Letter from Zacharias to Kistiakowsky, 7 June, 68, in folder "Defense Communication Planning Group", in *ibid.*

[106] "Kistiakowsky Cuts Defense Department Ties over Vietnam", *Science*, CLIX (March 1968), p. 958; Clark, Evert, "Top Scientist Cuts All Links to War", *The New York Times*, 1 March, 1968, p. 1.

charged issue throughout the war. However, the scientists were aware of this from the outset and nevertheless felt the barrier could make a contribution on the political side. The scientists assumed (on the basis of their military and CIA briefings) that some 5,000–7,000 troops were infiltrating per month, and something like 600 trucks carrying 1,500 tons per month traversed Laos.[107] However, they also recognised that there was a possibility that "Main Force supply requirements are as low as 10 tons per day."[108] Ignorance of the enemy's low logistical needs is not an excuse for the strategic failure of their barrier proposal. Similarly, a second explanation could argue that the military was never willing to use the scientists' proposal as a way to stop the bombing of the North and potentially open the way for negotiations, whatever the effects of the McNamara Line. Without this reduction of pressure, the North Vietnamese only felt the sting of the stick and never saw the promise of the carrot, and thus were unwilling to enter negotiations. However, this explanation is not completely convincing: following the bombing halt of 1 November, 1968, for a brief period the barrier was essentially being used as the scientists had hoped. Yet this temporary de-escalation of the bombing did not induce any new flexibility on the part of North Vietnamese diplomats, and American involvement in the war dragged on for another five years.

Instead, a third factor seems most persuasive in explaining the failure. The North Vietnamese, and their allies, were quite willing to accept the higher burden in costs for logistics that the McNamara Line imposed on them. Accounting for the failure of the Commando Hunt campaigns, one analyst notes: "the cost to the enemy of replacing bomb damage in southern Laos was largely shifted through external aid to other nations of the Communist block."[109] While the scientists had noted this phenomenon with regards to strategic bombing, they had not recognised that the same could apply to their barrier. In not doing so they suffered from misconceptions endemic throughout American elites at the time: a lack of appreciation of the high levels of motivation in post-colonial nationalist movements and a misunderstanding of the ability of other Communist nations to assist the North Vietnamese Army.

The North Vietnamese simply found other routes. Increasing the role of Cambodia and sea-based logistics were obvious responses to the growing costs of traversing the Ho Chi Minh Trail. In this regard the scientists' strategic view suffered from "the fallacy of the last move". They were quite explicit in their expectations regarding the "battle of the barrier" as tactical innovation by the enemy in response to their proposal. However, they could not extrapolate this insight to the strategic level, thus ignoring the possibilities for circumventing the entire demilitarised zone and Laos area.

The second explanation for the failure of the scientists' plan looks to their susceptibility to manipulation from the military. Their expectations about their

[107] All figures from IDA, "Air Supported Anti-Infiltration Barrier", *op. cit.*, pp. 22, 37, 59.
[108] *Ibid.*, p. 62.
[109] Gilster, H. L., *The Air War in Southeast Asia, op. cit.*, p. 28.

ability to change the course of the war from outside both the government and the military seem overblown in retrospect.

The military from the outset resented having this project forced upon them. They did everything they could to bend its components to make them consistent with their own goals: manipulating the strong-point system to provide a jumping off point for Westmoreland's hoped-for invasion of Laos; the abandonment of this system after he left; and the extensive use of the sensors in-country. The military avoided the spirit of the orders from their civilian superiors: for example, they used bureaucratic manoeuvres to stall progress on the plan, and levied false accusations at their civilian leaders. The military perspective on the scientist-advisers' proposal was clear. Phillip Davidson, Westmoreland's intelligence officer, summarised it with unpleasant frankness:

> This order [creating DCPG] brought on a classic struggle between the top military leaders and the top civilians in the defense establishment. The military scorned and belittled the concepts, calling it "McNamara's Line," obliquely referring to another ill-fated defense minister, the Frenchman Maginot. The generals tried to change the concept; they tried anything to delay or obstruct it.[110]

In doing so, they ensured the failure of the system as a strategy for paving the way for negotiations through de-escalating the war over the long term. Instead, it provided the Air Force with valuable new tools for its bombing campaigns. It gave the Army a rationale for a presence in the north of South Vietnam and useful new intelligence gathering tools for use throughout Southeast Asia. In the end, these marginal enhancements to tactical, military capabilities that came from Igloo White had no material effect on the overall course of the American defeat in the Vietnam war.

Implications for Understanding Scientist-Advisers in Defence Policy

I suggested at at outset that an examination of the McNamara Line proposal would be useful in two ways: it would exemplify many elements of the scientist-advisers' role in defence policy-making and provide a window into an important cause of the destruction of that role. With regard to the former contribution, this example supports several of the generalisations made about the science-advisory process. In terms of the personal modes of thinking that scientist-advisers were thought to bring to the table, several factors were indeed apparent. The scientists felt a large degree of optimism over their abilities to "solve" the problem of the Vietnam war. The scientists displayed a propensity for the "whole problem approach" as expected. Rather than limiting their focus to military strategies, the scientists suggested an integrated proposal of technical means to support a new military tactic that would allow for the effective pursuit of the national grand strategy.

In terms of the means and mechanisms that scientist-advisers use to influence policy, again, the example of the barrier proposal buttresses this

[110] Davidson, P. B., *Vietnam at War, op. cit.*, p. 392.

generalisation. The summer study's substantive suggestions were clearly valuable, but the group's effect was achieved through the personal contacts between some of its senior members and various government officials. Thus, when the senior political leaders who supported the project left government, the effectiveness of the scientist-advisers declined: the project began to be implemented in December 1967; on 29 February, 1968, McNamara left the Pentagon; on 31 March, President Johnson announced that he would not run for re-election; on 11 June, General Westmoreland stepped down from command to return to Washington. These changes removed all of the strongest proponents of the project then in government. Once they had left, the direction of the project fully reflected the preferences of the military. The strategic goal of the project that had inspired the scientists and that had captured McNamara's interest was gone. The abdication of political leadership allowed the bureaucratic influences within the military to determine policy.

Finally, the shortcomings that account for the failure of the programme also exemplify the general characteristics of the role of scientist-advisers in defence policy-making. Their mistakes are reminiscent of the shortcomings for defence policy-making originating in the intellectual characteristics and methodological predilections of scientists. Countermeasures at a strategic level were not thought through, and the vast uncertainties in issues like the adversary's motivations and logistical needs were not integrated within the analysis.

Similarly, the military showed an expected reluctance to accept outside advice, preferring instead to rely on their own expertise. They protected their independence using a variety of tactics, not least of which was patience. The case illustrates the inherent difficulties of part-time advisers living outside Washington, and outside the formal policy process, who had to deal with facing full-time Pentagon employees. The military repeatedly recognised that it would be able control the eventual implementation of the programme.

Aside from illustrating a number of factors generic to the process of using scientific advice, this case contributes to an explanation of the rift between civilian scientist-advisers and defence policy-makers created during the period. At the end of this long, evolving programme, both sides—the scientist-advisers and the military—had reason to feel "burned". Kistiakowsky's unintended "going public" with his severing of ties with the Pentagon added friction between civilian scientist-advisers and their military advisees at precisely the low point of relations between those two broad communities. The severe societal effects of the Vietnam war made sympathetic consideration of either side's motives by the other impossible. The degree of spite apparent in statements like that of Davidson, and of Kistiakowsky, seems more pronounced than is usual in American politics. The impact of the rift remains today: for example, the President's Science Advisory Committee plays almost no role on defence issues, while the Defense Science Board is dominated by industry and military representatives.[111]

[111] Smith, B., *The Advisors, op. cit.*, pp. 58, 168; Trenn, T., *America's Golden Bough, op. cit.*, pp. 60ff.

The United States, as a society, has done much to move out of the shadow of the Vietnam tragedy. President Bush pronounced its legacy dead following the American victory in the Gulf War in 1991. Similarly, a case can be made that relations between the academy and the military have healed substantially. However, relations between civilian scientist-advisers and the military and defence policy-makers have not returned to where they were in their heyday in the 1950s.

Clearly, this case occurred as profound socio-cultural changes were taking place. By the late 1960s, the military could increasingly draw upon technical expertise from within, making the potential scientific contribution much less valuable. Both these factors would have certainly led to a decline in the role for civilian scientist-advisers in the United States. However, the bitter acrimony with which relations were severed in this case has had a lasting impact which accentuated these other factors. With less need for outside scientific advice and with a bitter taste remaining of their last experiment, the military today remains content to chart its own path in this area.

The McNamara Line was in many ways the last, and the greatest, attempt by civilian scientist-advisers to play such a direct role in defence policy-making.

NOTE: I would like to thank Professor Harvey Sapolsky for his intellectual leadership and financial support, and Mrs Elaine Kistiakowsky for her permission to read her late husband's records.